

ABSTRACT

THESIS: Clinical Gait Analysis in Children and Adolescents with Autism Spectrum Disorder

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Individuals with autism spectrum disorder (ASD) often exhibit motor deficits. It was unclear how children and adolescences with ASD develop their gait patterns due to the possible motor deficits. In order to understand the mechanism of movement coordination in children with ASD, this study aimed to examine temporal spatial parameters and three-dimensional kinematic and kinetic gait mechanics exhibited by children with ASD. This study also assessed leg strength, a key determinant of gait quality. Eleven participants aged 8-17 with ASD were recruited. Eleven age-and-gender matched typically developing children and adolescents were recruited as the control group. Participants walked on a force-instrumented treadmill at a constant speed for five minutes while motion capture was performed via a 15-camera Vicon system. Following the walking task, participants performed maximal voluntary isometric contractions on a Cybex dynamometer to assess their knee muscle strength.

Children and adolescents with ASD showed significantly shorter stride length, greater cadence and higher stride width variability compared to the control group. Also, participants with ASD demonstrated weaker strength in leg extensor, and smaller ankle dorsiflexion during initial heel strike. The peak hip flexion angle during the stance phase was significantly higher in the experimental group. Moreover, participants with ASD exhibited significantly greater hip external rotation during the stance phase in the transverse plane and a significantly increased foot progression angle during foot flat

compared to the control group. Furthermore, participants with ASD showed significantly increased peak ankle dorsiflexor moments and smaller peak knee flexor moments.

In conclusion, participants with ASD demonstrated deficits in muscle strength and differences in gait patterns in comparison with the age and gender-matched control group.